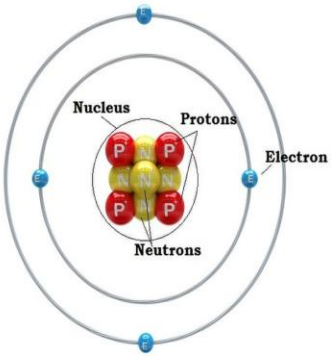
Name _____ Date _____ Segment _____



ANSWERS - STUDY GUIDE – Unit Test: Atoms, Structure of Matter & Phase Changes

Atom - the "building block" of matter – what everything is MADE of

- **In the Nucleus:**
  - **Proton**: has a __**POSITIVE**___ charge and
  - **Neutron**: has _**NO**___ charge

- **Surrounding the nucleus:**
  - **Electron**: has a __**NEGATIVE**_____ charge

The Periodic table: elements are listed in order of Atomic _**NUMBER**_____ = number of ___**PROTONS**____, which is what makes an element what it is.

How many Periods are on the Periodic Table? ____**7**____

How many Groups are on the Periodic Table? ____**18**____

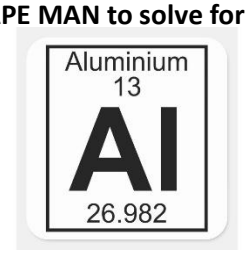
Mass number = total number of _**PROTONS** and **NEUTRONS** in the nucleus of atoms

***Fill out the blanks below for what each letter means for APE MAN:**

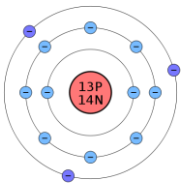
A = P = E: _ATOMIC #_ = _PROTONS_=_ELECTRONS__

M – A = N: _MASS #__ - _ ATOMIC #__ = _ NEUTRONS _

***Use APE MAN to solve for the number of subatomic particles for Aluminum:**



Atomic # = ___13_____
Mass # = _____27_____
# of Protons = ___13_____
# of Electrons = ___13_____
# of Neutrons = *(*show your work)* ___27 – 13 = 14_____

DRAW a Bohr Model of an atom of Aluminum. **Include protons, neutrons, and electrons, AND show the charges of each particle.	**DRAW a Lewis Structure Dot Diagram for the element Aluminum.**
P = + **N = 0** **E = -** 	

Matter - anything that has _MASS___ and takes up _**SPACE**_____

Kinetic Theory describes how ____**MOLECULES / ATOMS** _____ behave
(**Circle the correct answers*)→ As the state changes from lower energy to higher energy the particles move (***faster*** *OR slower)* and move (***farther apart*** *OR closer together).*

Particles of a __**SOLID**_____ are locked in place vibrating, they don't have much energy but have a lot of attraction.
Particles of a ____**LIQUID**_____ slide around each other, have more energy & less attraction to each other than solids.
Particles of a gas have the most __**ENERGY**_____ and the least ___**ATTRACTION**_____.

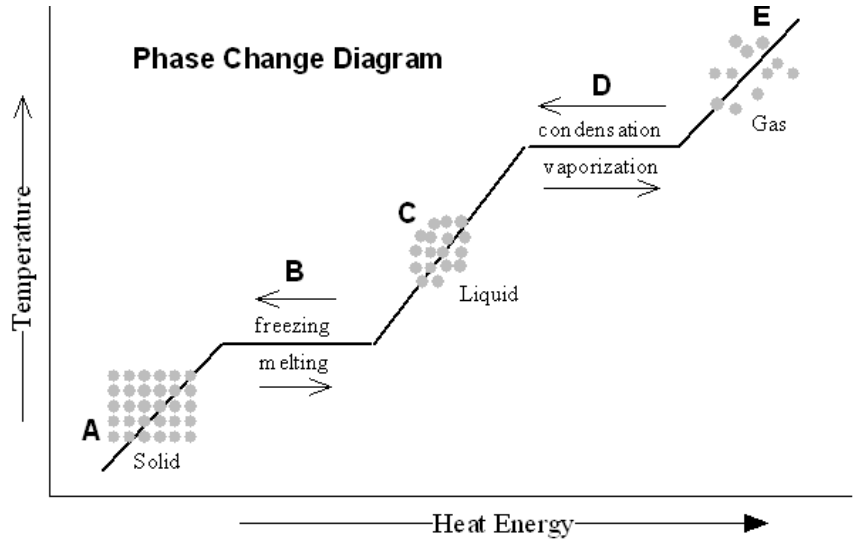
For each state / phase of matter, describe the particle movement, energy level and particle attraction.

State (phase)	Description of particles	Energy level	Particle attraction
solid	*very close together and vibrate*	*lowest*	*most / a lot*
liquid	*not as close as solids, move around each other*	*more*	*less*
gas	*far apart, as far as they can go, and fast*	*even more*	*even less*
plasma	*super fast and excited, they glow / light up*	*most!*	*Least*

Matter changes from one state to another (phase change)

State change Name	Example	Energy/Heat (*absorbed / released*)
Solid to Liquid = *melting*	*ice to water*	*absorbed*
Liquid to Solid = *freezing*	*water to ice*	*released*
Liquid to Gas = *evaporation*	*water to vapor*	*absorbed*
Gas to Liquid = *condensation*	*vapor to water*	*released*
Solid to Gas = *sublimation*	*dry ice to CO_2*	*absorbed*
Gas to Solid = *deposition*	*CO_2 to dry ice*	*released*

Phase Change Diagram: *label EACH box→→



What State of Matter is represented by C?
liquid
What phase changes occur at B?
Freezing AND melting
What state of matter is at E?
gas
If a substance melts at 90 degrees Celsius, at what temperature does it freeze?
90 degrees Celsius
What state is matter at A?
solid
What is NOT happening at the flat lines during B & D?
Temperature is NOT changing

Describe the **relationship** between energy, temperature, and particle movement (*molecular motion*). **Be able to describe this relationship as heat energy is being absorbed OR released.
As heat energy is added, particles move faster and farther apart, and temperature rises.

As heat energy is removed, particles move slower, and get closer together, and temperature lowers.